



Jaunt

Feasibility Study of Alternative Fueled Buses
Advisory Committee Meeting 2: September 22, 2022



Today's Objectives

Understand the potential impacts of alternative propulsion technologies to Jaunt.

Generate ideas to leverage the highest-value opportunities and work around barriers.

Agenda

- Project Goals Refresher
- Background and Analysis
 - Project Status to Date
 - Current System and Service Area
 - Assumptions and Range Analysis
- Technology Opportunities and Barriers
 - Battery Electric (EV)
 - Hydrogen Fuel Cell (FCEV)
 - Compressed Natural Gas or Renewable Natural Gas (CNG or RNG)
- Questions & Discussion
- Next Steps

Project Goals

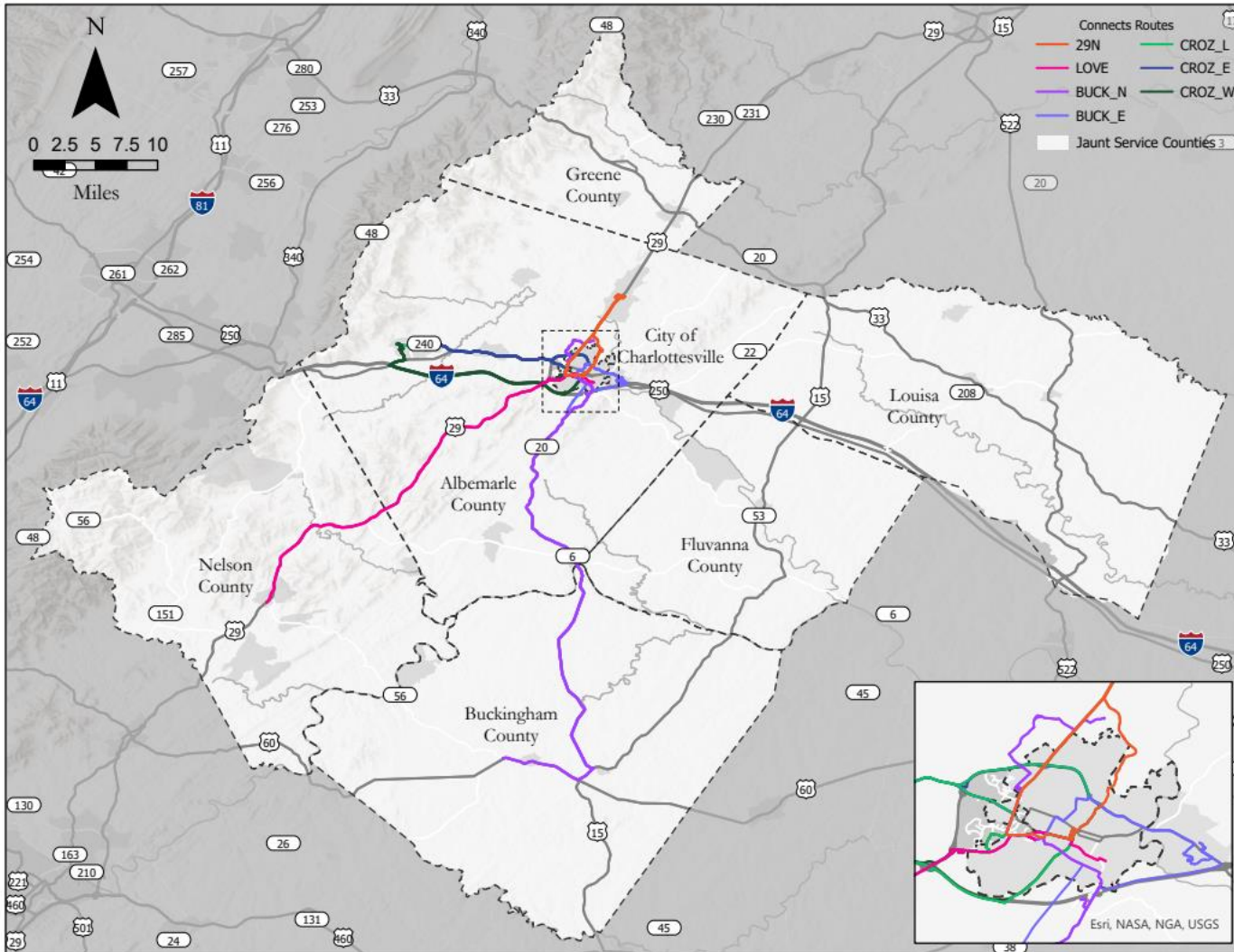
- Achieve **45%** GHG reduction by 2030; net zero by **2050**
- Determine a preferred cleaner fuel type for Jaunt
 - Consider trade-offs including operating and capital cost, emissions impact, and operational viability
 - Balance the current level of service with practicality of low or no emissions vehicles (minimize impact to operations)
 - Consider well-to-wheel impact of propulsion technology on emissions
- Determine high level implementation strategy and timeline of the preferred fuel type

Background and Analysis

Status to Date

- More than halfway through the feasibility study
- Conducted interview with two peer agencies: SARTA and SunLine
- Conducting interviews with utility providers
- Developing scenarios and cost analysis
- Preparing lifecycle greenhouse gas emissions

Jaunt's Current System



- Serves Charlottesville and six surrounding counties
- 7 fixed-route commuter service lines
- 19 demand response run classes
 - ADA Service
 - Links from the counties to Charlottesville
 - Circulator services within counties

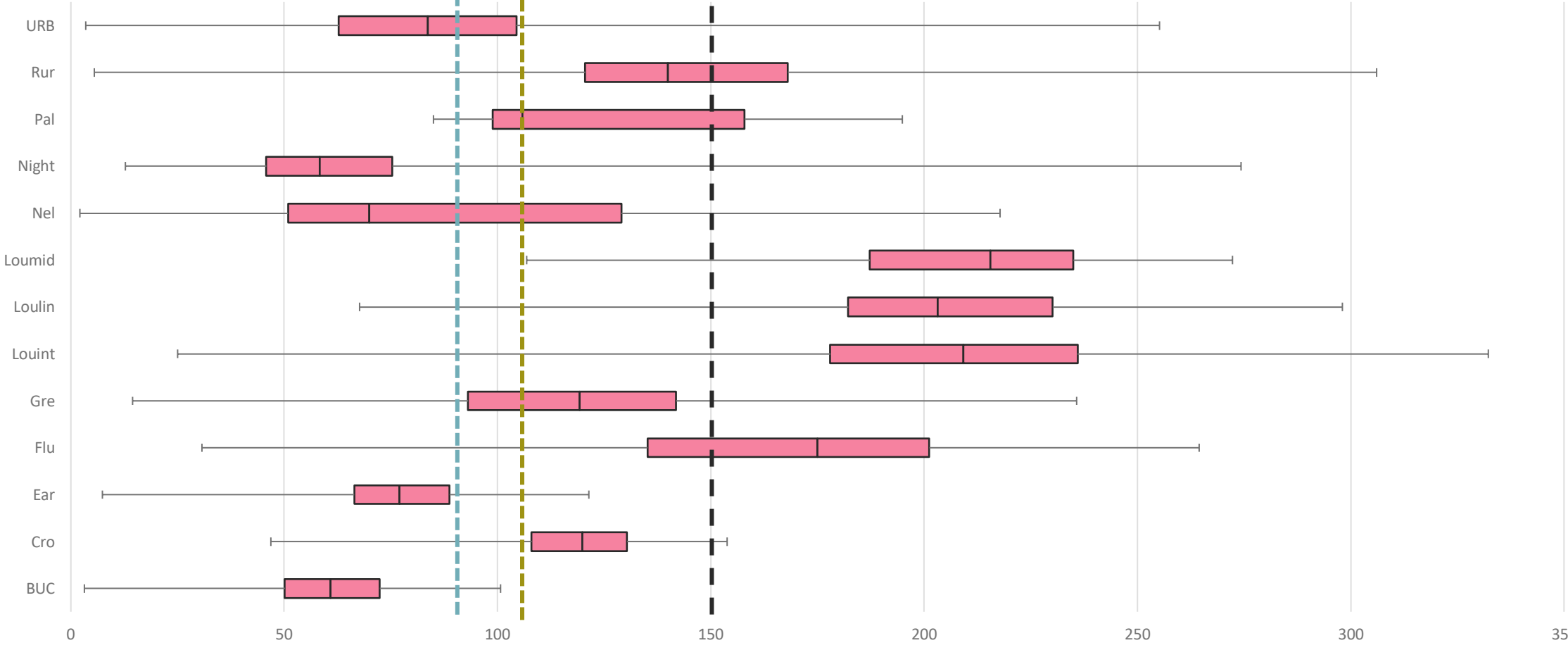
Analysis Assumptions

- Analysis was based on Jaunt's 2021/2022 existing conditions
 - 2022 Fleet and Run Classes
- Assumptions based on 2022 market trends and technology capabilities
- Analysis Assumptions
 - EV range of 100-150 miles
 - 30% and 40% reductions in range were used as benchmarks
 - Reductions were determined through industry standards and literature reviews
 - CNG and FCEV range of 300 miles

Demand Response BEV Performance

- Stated Range
- 30% Reduction
- 40% Reduction

150 Miles Stated Range

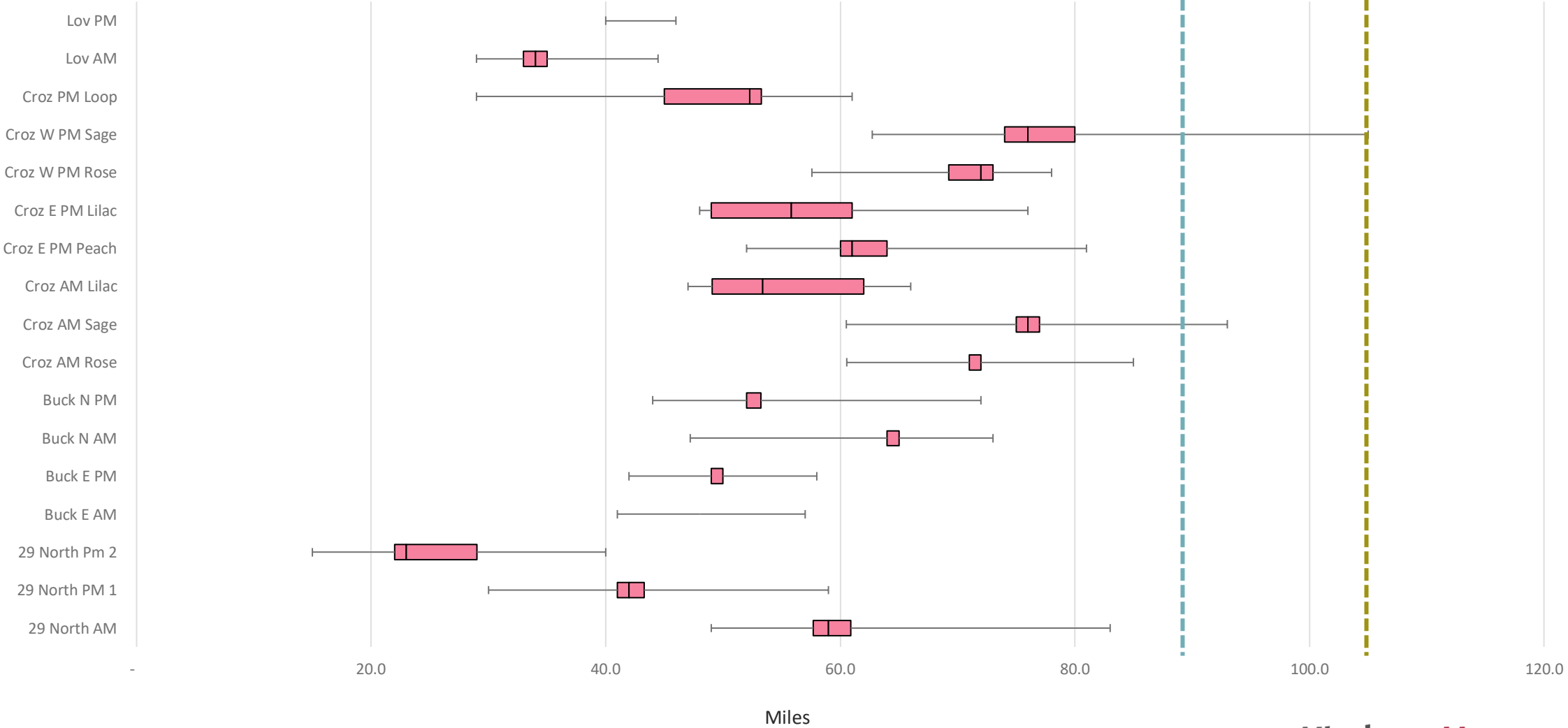


Miles

Fixed-Route BEV Performance

--- 30% Reduction
 --- 40% Reduction

150 Mile Stated Range



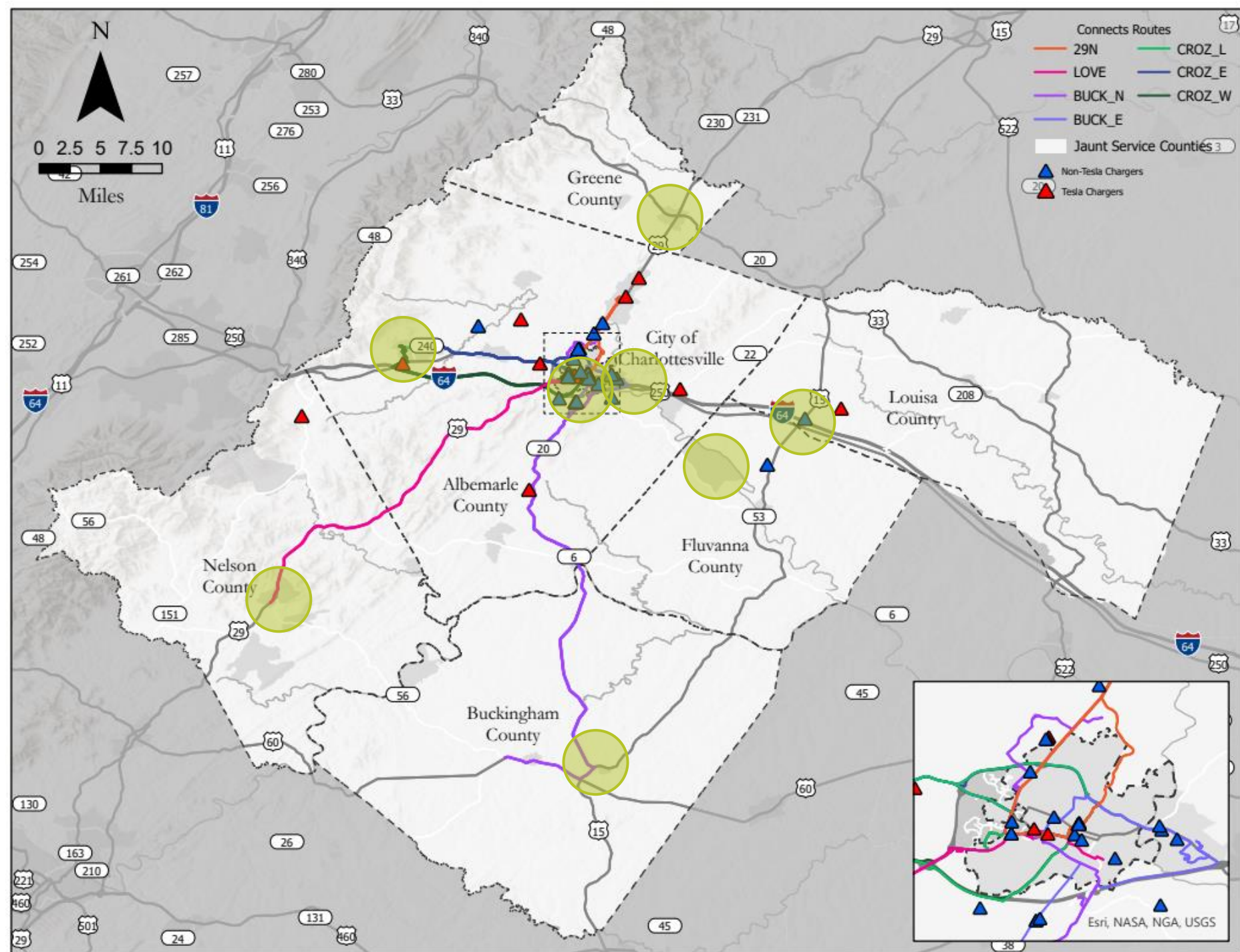
Technology Opportunities and Barriers



Battery Electric Vehicles



- Opportunities
 - Most (if not all) *fixed route* service could be accommodated with commercially-ready EVs
 - Technology is scalable to number of vehicles deployed
- Barriers
 - Range - Most *paratransit* service would **not** be completed with the same number of vehicles as today
 - Charging operations would require additional space and staff oversight
- Items for Discussion
 - What are opportunities for on-route charging locations and/or additional depots in each service area?
 - What is the desire to procure additional vehicles?



Potential Charging Locations

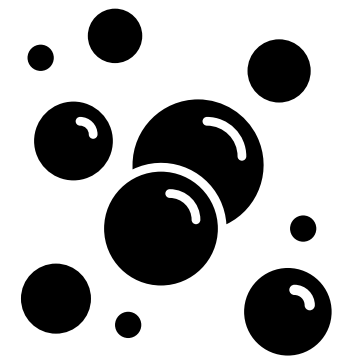
Jaunt County	Community
Albemarle -- west	Crozet
Albemarle -- east	Pantops (west of I-64/US250)
Buckingham	Dillwyn (Highway 20/US15)
Fluvanna	Lake Monticello
Greene	Ruckersville
Louisa	Zion Crossroads (I-64/US15)
Nelson	Lovingston
Charlottesville (City)	Jaunt HQ

Hydrogen Fuel Cell Electric Vehicles



- Opportunities
 - All fixed-route and demand response service could be accommodated with FCEVs
 - Hydrogen deployment is more cost-effective for systems with more vehicles
- Barriers
 - Sourcing – no distributors or commercial fueling stations in the Charlottesville area
 - Cost – hydrogen has a significant upfront costs with fueling/storage infrastructure and vehicle procurement
 - Upstream Emissions – Not all hydrogen production methods have zero carbon footprint and most commercial sources use natural gas reformation
- Items for Discussion
 - Could Jaunt or partners accommodate a local hydrogen production plant?
 - Is the hydrogen vehicle market mature enough for implementation?

Compressed and Renewable Natural Gas



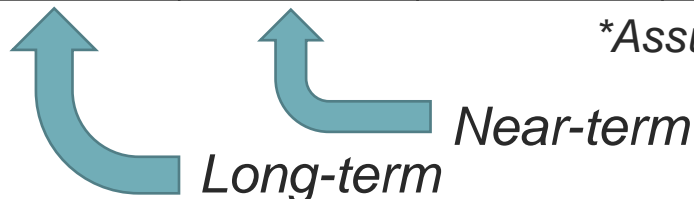
- Opportunities
 - All fixed-route and demand response service could be accommodated with CNG vehicles
 - CNG is a widely-adopted technology
 - There may be renewable sources which could have *negative* carbon emissions
- Barriers
 - CNG is not zero emissions
 - Most renewable natural gas is mixed into the distribution network
- Items for Discussion
 - What is the perception of using natural gas as a fuel?
 - Would near-term deployment be worth installation if equipment could be later converted for hydrogen?

Comparison of Technologies



Scenario	Number of Vehicles	Emissions Reduction		Vehicle Costs	Facility Costs	Operational Costs (Fuel+Maintenance)
Current	108	-		\$	-	\$\$
Battery Electric	157	●●●●●	●●●●	\$\$\$\$	\$\$\$\$	\$
Battery Electric w/ Fast Charging	108-114*	●●●●●	●●●●	\$\$\$	\$\$\$\$\$	\$\$
Hydrogen	108	●●●●●	●●●	\$\$\$	\$\$\$	\$\$\$
CNG/RNG	108	●●●●	●●	\$	\$\$	\$\$

*Assumes standby vehicle in each County



Questions & Discussion

Questions for Discussion

- Which opportunities seem most feasible to act on?
- Which barriers seem the most insurmountable?
- Is Jaunt willing to acquire additional land?
- How could partnerships leverage opportunities or remove barriers?
- Is there an opportunity to use multiple technologies to achieve Jaunt's goals?

Next Steps

- Conduct an interview with Charlottesville Utilities
- Finalize transition scenarios
 - Develop numerical Greenhouse Gas emission comparison
 - Develop relative cost comparison
- Prepare initial prioritization
- Return to the Advisory Committee in November* for Prioritization and Recommendations